



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/686,687	10/16/2003	John Gavin MacDonald	KCX-840 (19192)	8963
22827	7590	01/30/2006	EXAMINER	
DORITY & MANNING, P.A. POST OFFICE BOX 1449 GREENVILLE, SC 29602-1449			SPERTY, ARDEN B	
		ART UNIT	PAPER NUMBER	
		1771		

DATE MAILED: 01/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>
	10/686,687	MACDONALD ET AL.
	<b>Examiner</b>	<b>Art Unit</b>
	Arden B. Sperty	1771

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 28 October 2005.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 39-75 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) 57-75 is/are allowed.
- 6) Claim(s) 39-56 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:
1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 12/12/2005.
- 4) Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: \_\_\_\_\_.

## **FINAL OFFICE ACTION**

1. Applicant's amendments and comments, dated 10/28/05, have been entered and carefully considered. All previously pending claims have been cancelled, and replaced by new claims 39-75. The newly submitted claims require additional search because of the newly introduced limitations of claim 52. This action is therefore made FINAL.
2. Applicant's arguments regarding the references applied to previous claims 1-38 have been considered and are addressed below in the section Response to Arguments. Although the previously cited prior art is hereby withdrawn, as explained in the Response to Arguments section below, an updated search provided additional prior art herein applied to the presently pending claims 39-75.

### ***Information Disclosure Statement***

3. The information disclosure statement (IDS) submitted on 12/12/05 is being considered by the examiner.

### ***Claim Rejections - 35 USC § 102***

4. Claims 39-41, 43-48, 50, 51, 56 are rejected under 35 U.S.C. 102(e) as being anticipated by US Pub 2002/0149656 to Nohr, et al.

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in

the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

5. Nohr teaches nanoparticles which are effective in coatings for paper products and textiles (para. 18). Paper products and textiles are analogous to Applicant's claimed fibrous substrate. The nanoparticles, before coating, may have an average diameter of less than 1000 nm (para. 23). The nanoparticles may be of a positive or negative zeta potential before modification (para. 25). The prior art is concerned with applying layers of alternating zeta potential to the nanoparticle (para. 13), thus anticipating claim 39. The coatings include colorant stabilizers (para. 76) including a metal ion (para. 78, 81) of iron, cobalt, or copper. Nohr further teaches carriers, such as polymers (para. 109), which are analogous to the claimed binder.

6. Claim 40 requires the negative zeta potential of the unmodified nanoparticle to be from about -1 mV to about -50mV. Examples 13, 14, and 30, are non-limiting examples of a negative nanoparticle having a zeta potential within the claimed range. Furthermore, it can be reasonably presumed that at least one of the various nanoparticles, recited in paragraphs 24 and 44, for use in practicing the invention, will inherently have a zeta potential falling within the claimed range. This presumption of inherency is based on the ability to modify the zeta potential of a nanoparticle by varying the pH of the solution in which it is suspended. Thus, while the exemplary nanoparticles may inherently have a zeta potential falling within the claimed range, the zeta potential of each nanoparticle may also be widely manipulated by pH. Controlling zeta potential with pH is known in the art, and is also described in the prior art. Absent a showing that

the disclosed nanoparticles may NOT have a zeta potential within the claimed range, it is the examiner's position that the requirements of the claim are met. Furthermore, there does not appear to be a criticality with respect to the requirements of claim 40.

7. Claim 41 requires the zeta potential of the modified nanoparticle to be more positive than the zeta potential of the unmodified nanoparticle. The Nohr reference teaches nanoparticles having positive or negative zeta potentials (para. 24) modified with layers of alternating zeta potential. Therefore, when the nanoparticle has a negative zeta potential, the first layer will have a positive zeta potential, thus meeting the claim limitations. When the nanoparticle has a positive zeta potential, the first layer will have a negative zeta potential. Both embodiments are anticipated by the Nohr reference, without picking and choosing.

8. Specifically regarding claim 47, paragraph 58 teaches silica nanoparticles.

9. Specifically regarding claim 50, paragraph 101 teaches nonwoven fabrics.

Regarding claim 51, the fibrous substrate may also be cellulosic (para. 101, and Example 12).

10. The process limitations of claim 56 have been considered, but are not seen to differentiate the structure over that of the prior art.

***Claim Rejections - 35 USC § 103***

11. Claim 49, 52, 53 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Pub 2002/0149656 to Nohr, as applied to claim 39 above.
12. Regarding claim 49, the Nohr reference teaches coated woven and non-woven fabrics, textiles, plastics, clothing (para 101), and cites specific tests performed with synthetic fabrics such as nylon, polyester, acrylic, and acetate (Table 3, Table 5, Table 8). Although the reference does not specify polyolefin fabrics, as required by claim 49, it would have been obvious to one of ordinary skill in the art to substitute one known polymeric fabric for another known polymeric fabric, according to the ultimate intended use of the fabric. Absent a showing of unexpected results with a polyolefin fabric, no patentable distinction can be seen.
13. Regarding claims 52 and 53, the amount of nanoparticles and/or binder can be determined by one of ordinary skill in the art without undue experimentation, and therefore would have been obvious, if not explicitly disclosed by the reference.
14. The reference is not concerned with the final shape of the substrate to which the nanoparticles are applied. Since the intended "personal care product" and "protective barrier clothing" uses do not imply any specific structure, the claims are seen to be met by the nanoparticle coated fabrics taught by the reference. The claimed uses do not impart further structure.

***Claim Rejections - 35 USC § 102/103***

15. Claims 39-41, 43-50, and 52-56 are rejected under 35 U.S.C. 102(e) as being anticipated by, or in the alternative, under 35 U.S.C. 103(a) as being unpatentable over, US Patent 4525410 to Hagiwara, et al.

16. The Hagiwara reference teaches fixing an antibacterial metal ion onto a zeolite material, and incorporating the metal ion-fixed zeolite material in a fiber article (col. 1, lines 44-55). The zeolite has a surface area of at least 150 m<sup>2</sup>/g (col. 1, lines 60-61). Zeolites possess a negative zeta potential, thus meeting the charge requirement of claim 39. The fiber material is a bicomponent fiber wherein the low-melting component acts as a binder of zeolite (col. 5, lines 47-66). Materials for the fibrous component include the polyolefins polyethylene and polypropylene (col. 5, lines 38-46). The prior art prefers particles of about one micron or larger (col. 3, lines 33-40), for stably retaining the zeolite in the fiber assembly. One micron is at the larger end of what is generally accepted as "nano" size; one of ordinary skill in the art would interpret "nano" as about one micron or smaller. According to this ordinary skill level, the disclosure of "about one micron" anticipates the claimed invention. Although particles larger than about one micron are preferred, it has been held that obviousness may exist despite the situation wherein teachings relied upon are disclosed as non-preferred, *In re Boe*, 53 CCPA 1079; 148 USPQ 507. Therefore although the prior art prefers particles of about one micron or larger, because the prior art finds zeolite retainability in fiber assemblies advantageous at this size, particles in the sub-micron size would still have been obvious

to one of ordinary skill in the art. Absent a showing of unexpected results, mere preferability does not equate to novelty.

17. Absent a showing of unexpected results with the zeta potential values of claim 40, the claimed range is not seen to patentably distinguish the claimed invention over the prior art. The zeta potential of the prior art was presumably unknown at the time the patent was issued. Zeolites (col. 3, lines 16-32) are now known to have negative zeta potentials, and as previously mentioned it is known to manipulate zeta potentials using pH. For these reasons, a patentable distinction is lacking in the claims. It would have been obvious to one of ordinary skill in the art to manipulate the negative zeta potential as needed, if the zeta potential was not already within the claimed range.

18. Since the negative zeta potential zeolite is treated with positive metal ions, the zeta potential of the final product will be more positive than that of the unmodified zeolite. Thus the limitations of claim 41 are met.

19. Regarding claim 50, the broad teaching of a nonwoven (col. 6, line 24) encompasses the claim limitations.

20. Regarding claims 52 and 53, the amount of nanoparticles and/or binder can be determined by one of ordinary skill in the art without undue experimentation, and therefore would have been obvious, if not explicitly disclosed by the reference.

21. The vague structural implications of claims 54-55 are encompassed by the varied intended uses disclosed in the reference (col. 9, lines 4-9).

22. The process limitations of claim 56 have been considered, but are not seen to differentiate the structure over that of the prior art.

***Response to Arguments***

23. The Maruo reference (US 5480636) does not appear to anticipate the presently pending claims under 35 USC 102. The Maruo reference does not anticipate independent claim 39, because the reference does not specifically recite a binder, nor is a binder apparently inherent. Since claim 39 is not anticipated by Maruo, it follows that claims dependent from 39 are not anticipated by Maruo. Maruo also fails to anticipate the limitations of claim 57, because the charge requirements of claim 57 are not disclosed or seen to be inherent. Since claim 57 is not anticipated by Maruo, it follows that claims dependent from 57 are not anticipated by Maruo.

24. Applicant's comments regarding the Nohr reference (US Pub 2002/0149656) have been considered. The argument that Nohr does not disclose a binder for adhering nanoparticles to a substrate, is unpersuasive. Paragraph 109 teaches carriers, such as polymers, which are analogous to the claimed binder. Applicant is further unpersuasive in pointing out that Nohr does not teach nanoparticles having a positive zeta potential (claim 57). Nohr, paragraph 25, states that the nanoparticles may have either a positive or negative zeta potential prior to modification. Therefore, Applicant's arguments are unpersuasive, and Nohr remains applied to the presently pending claims.

25. Applicant addresses the MacDonald reference (US Pub 2003/0203009), asserting that MacDonald fails to teach a binder (claim 39) or nanoparticles having a positive zeta potential (claim 57). As stated in the previous office action, MacDonald is not concerned with a binder in the intended uses, although inclusion of a binder would have been obvious and essentially required by several of the recited intended uses.

However obvious a binder might be, silence with respect to a binder results in claim 39 not being identically disclosed or described by the prior art. The reference is not applicable to claims 39-56 under 35 USC 102. Further, pursuant to Applicant's invocation of 35 USC 103(c), the reference is inapplicable as prior art, regardless of whether or not a binder would have been obvious, according to the disclosed intended uses, to one of ordinary skill in the art.

26. Applicant is unpersuasive in arguing that the MacDonald reference does not disclose positive zeta potential nanoparticles. Paragraph 22 states that positively charged metal ions are adsorbed onto a negatively charged surface of a nanoparticle and vice versa. Emphasis added. The "vice versa" of a positive ion on a negative particle, is a negative ion on a positive particle. Furthermore, paragraph 24 clearly recites a positive zeta potential nanoparticle. Despite MacDonald's positive recitation of a positive zeta potential nanoparticle, the reference does not identically disclose or describe a second, positive zeta potential, nanoparticle adhering a first, negative zeta potential, nanoparticle to the substrate. Paragraph 27 teaches using differently modified nanoparticles together, but does not identically disclose one nanoparticle adhering another nanoparticle to a substrate. While such may have been obvious to one of ordinary skill in the art, pursuant to Applicant's invocation of 35 USC 103(c), the reference is inapplicable as prior art. The reference is therefore not applied to claims 57-75.

***Allowable Subject Matter***

27. Claim 42 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Since the unmodified nanoparticle of claim 39 has a required negative zeta potential, the metal ion required by claim 39 is a positive ion. Therefore, claim 42 requires the negative zeta potential nanoparticle, modified by a positive metal ion, but still having a negative zeta potential of about -5 to -15 mV post-modification. The Nohr reference (US Pub 2002/0149656) teaches a negative zeta potential nanoparticle, modified by a metal ion of opposite charge (i.e. positive), with the result being a positive zeta potential coated nanoparticle. In other words, the resulting product would NOT have a negative zeta potential of about -5 to -15 mV.

28. Claim 57 requires second, positive zeta potential, nanoparticles to adhere the first, negative zeta potential, nanoparticles to the substrate. The Nohr reference is not seen to teach or fairly disclose a positive zeta potential nanoparticle adhering a negative zeta potential nanoparticle to a substrate. Claims 57-75 are therefore allowable as drafted. Further amendments to these claims may result in withdrawal of the indication as allowable, because further amendment may change the scope of the claims, or introduce issues addressable under 35 USC 112, first or second paragraph.

29. Claim 42 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claim 42 is distinguishable over US Patent

4525410 to Hagiwara, as applied to claim 39 above. The prior art does not teach or fairly suggest modifying a negative zeta potential particle with positive metal ions to yield a modified particle having a zeta potentially specifically between about -5 mV and -15 mV.

30. Claims 57-75 are distinguishable over the Hagiwara prior art, because the prior art is not seen to teach or fairly disclose a positive zeta potential nanoparticle adhering a negative zeta potential nanoparticle to a substrate. Claims 57-75 are therefore allowable as drafted. Further amendments to these claims may result in withdrawal of the indication as allowable, because further amendment may change the scope of the claims, or introduce issues addressable under 35 USC 112, first or second paragraph.

31. Also to be made of record:

USPN 5102592 to McCauley teaches silicon nitride particles, having a negative zeta potential, and an oppositely charged metal ion chemisorbed onto the surface of the particle (col. 3, lines 26-41; col. 4, lines 36-62). The chemisorbed metal ion acts as a sintering aid. Such particles are employed in phosphor screen utilities, such as described in US Pub 2004/0228963 to Van den Bergh, et al. (para. 18). When used in the phosphor screen utility, silicon nitride particles with sintering aids are applied to fibrous substrates. Although the combined teachings of McCauley and Van den Bergh, would have been obvious, the silicon nitride particles of McCauley have a low surface area (McCauley, column 6, lines 23-24) and the particle size is unknown. The prior art

does not teach or fairly suggest that the particles are of nanodimensions. Thus the instantly claimed invention is not rendered obvious in view of the combined prior art.

***Double Patenting***

32. Claims 39-75 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over original claims 1-58 and 63-67 of Application No. 10/137052. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims are drawn to overlapping inventions.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

33. Claims 39-75 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over original claims 36-43, 52-59, 68, and 70-74 of Application No. 10/686939. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims are drawn to overlapping inventions.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

34. Claims 39-75 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over original claims 1-23 of

Application No. 10/687425. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims are drawn to overlapping inventions.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

35. Claims 39-75 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over original claim 15 of Application No. 10/687269. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims are drawn to overlapping inventions.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arden B. Sperty whose telephone number is (571)272-1543. The examiner can normally be reached on M-Th, 08:00-16:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel Morris can be reached on (571)272-1478. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Arden B. Sperty  
Examiner  
Art Unit 1771

January 20, 2006



TERREL MORRIS  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700